

WHAT IS CLAIMED IS:

1. A material for plugging a well comprising compacted nodules comprising bentonite in admixture with a proportion of water to permit the formation of compacted nodules having a density of at least about 2.0 g/cm^3 and a mean particle survival at a crush force of at least 800 newtons and being capable of having at least 50% survival when dropped 1.5 meters onto a concrete surface.
2. A material for plugging a well of claim 1 comprising from about 35% to about 98% by weight bentonite, from about 0% to about 45% by weight nonbentonite solids, and from about 2% to about 20% by weight nonconnate water, said material being in the form of compacted nodules.
3. A material for plugging a well of claim 1 comprising from about 45% to about 95% by weight bentonite, from about 0% to about 35% by weight nonbentonite solids, and from about 5% to about 20% by weight nonconnate water.
4. The material for plugging a well of claim 1 comprising from about 50% to about 90% by weight bentonite, from about 0% to about 30% by weight nonbentonite solids, and from about 10% to about 20% by weight nonconnate water.
5. The material for plugging a well of claim 2 comprising from about 64% to about 88% by weight bentonite, from about 0% to about 20% by weight nonbentonite solids, and from about 12% to about 16% by weight nonconnate water.

6. The material for plugging a drill hole of claim 1 consisting essentially of from about 85% to about 90% by weight sodium bentonite and from about 10% to about 15% by weight nonconnate water.

7. The material for plugging a well of claim 1 wherein said compacted nodules are substantially pillow shaped with a largest cross sectional dimension is from about 7/8 inch to about 4 inches.

8. The material for plugging a well of claim 1 wherein said largest cross sectional dimension of from about 1 inch to about 4 inches.

9. The material for plugging a well of claim 1 wherein said compacted nodules are in the form of spheres having a diameter of from about 1 inch to about 4 inches.

10. The material for plugging a well of claim 1 wherein said compacted nodules are in the form of flattened spheres having a major diameter of from about 1 inch to about 4 inches and a minor diameter wherein the minor diameter is from about 0.50 to 0.99 times the major diameter.

11. A method for forming a material for plugging a well comprising

- obtaining a feedstock comprising bentonite in admixture with a proportion of water to permit the formation of compacted nodules having a density of at least 2.0 g/cm^3 and a mean particle survival at a crush force of at least 800 newtons and capable of having at least 50% survival when dropped 1.5 meters onto a concrete surface,

- b. feeding the feedstock under pressure to a continuous roll press machine under conditions to permit the formation of said compacted nodules and
- c. recovering the compacted nodules.

12. The method of claim 11 wherein the feedstock comprises from about 35% to about 98% by weight bentonite, from about 0% to about 45% by weight nonbentonite solids, and from about 2% to about 20% by weight nonconnate water.

13. The method of claim 11 wherein the feedstock comprises from about 45% to about 95% by weight bentonite, from about 0% to about 35% by weight nonbentonite solids, and from about 5% to about 20% by weight nonconnate water.

14. The method of claim 11 wherein the feedstock comprises from about 64% to about 88% by weight bentonite, from about 0% to about 20% by weight nonbentonite solids, and from about 12% to about 16% by weight nonconnate water.

15. The method of claim 11 wherein the feedstock consists essentially of from about 85% to about 90% by weight bentonite and from about 10% to about 15% by weight nonconnate water.

16. The method of claim 11 wherein the pressure is a pressure of at least about 1 Mpa.

17. The method of claim 11 wherein the pressure is a pressure of at least about 3 Mpa.

18. The method of claim 11 wherein the pressure is a pressure of at least about 5 Mpa.

19. The method of claim 11 wherein said continuous manufacturing machine is a roller press.

20. The method of claim 11 wherein said roller press is operated at a speed of from about 2 RPM to about 50 RPM.

21. A material for plugging a well, said material being in the form of compacted nodules having a density of at least 2.0 g/cm^3 , and a mean particle survival at a crush force of at least 800 newtons and capable of having at least 50% survival when dropped 1.5 meters onto a concrete surface, said material being formed by the process comprising

- a. obtaining a feedstock comprising sodium bentonite in admixture with a proportion of water to permit the formation of compacted nodules having a density of at least 2.0 g/cm^3 , and a mean particle survival at a crush force of at least 800 newtons and capable of having at least 50% survival when dropped 1.5 meters onto a concrete surface.
- b. feeding the feedstock under pressure to a continuous roll press machine under conditions to permit the formation of said compacted nodules and
- c. recovering the compacted nodules.

22. A method for plugging a well having a bottom, a length and an opening at a surface comprising:

- a. introducing a plurality of nodules into the well, said nodules comprising bentonite in admixture with a proportion of water to permit the formation of compacted nodules having a density of at least 2.0 g/cm^3 , and a mean particle survival at a crush force of at least 800 newtons and capable of having at least 50% survival when dropped 1.5 meters onto a concrete surface,
- b. permitting the introduced nodules to come in contact with additional water, in an amount and for a time adequate to cause the nodules to swell and form a substantially hydraulically solid plug in the well.

23. The method of claim 22 wherein said nodules are introduced into the bottom of the well by falling from said opening to said bottom.

24. The method of claim 22 wherein said nodules are introduced over the length of the well.

25. The method of claim 22 wherein said nodules are introduced over at least one portion of the length of the well and wherein nonbentonite material is introduced into at least one other portion of the length of the well.

26. The method of claim 22 wherein heat is introduced into the well.

27. The method of claim 22 wherein the well contains viscous material and wherein hot water is introduced into the well to reduce the viscosity of said viscous material.

28. The method of claim 22 wherein the hot water is introduced into the well prior to introducing the nodules.

29. The method of claim 22 wherein the well contains saline water.

30. The method of claim 22 wherein the nodules contain additional water to compensate for the salinity in the saline water.

31. The method of claim 22 wherein the compacted nodules are substantially pillow shaped with a largest cross sectional dimension of from about 1 inch to about 6 inches.

32. The method of claim 22 wherein the compacted nodules are in the form of spheres having a diameter of from about 1 inch to about 6 inches.

33. The method of claim 22 where the compacted nodules are in the form of flattened spheres having a major diameter of from about 1 inch to about 6 inches and a minor diameter which is from about 0.99 to 0.50 times the major diameter.